

dependent on the rpm of the internal combustion engine 12. With the electric energy generated by the crankshaft generator 26, the two wheels 28 are driven by the electric motors 32, which are allocated to the vehicle axle 30 and which are embodied in the form of asynchronous motors. The vehicle axle 30 is embodied in the form of a steering-type front axle of the agricultural utility vehicle 10, namely in the form of a rigid axle. Between the electric motors 32 and the wheels 28 there are gear stages 34 and 36, with which the rpm values of the electric motors 32 are reduced.

The vehicle axle 30 is attached to the frame 14 of the agricultural utility vehicle 10 so that it can move, wherein the vehicle axle 30 is suspended so that it can oscillate. For supporting the moving or oscillating suspension, there is a torque tube 38, which is attached with one end to the frame 14 and with its other end to the vehicle axle 30.

According to the invention, electric components 40, 42 for the electric drives 32 are provided on or in the torque tube 38. These electric components 40, 42 include a power electronics assembly 40, to which is allocated a frequency converter and a controller for controlling the electric drives 32 and which is shown in Figure 2 as one assembly. As other electric components in the torque tube 38, there is braking resistance 42, with which the electric energy generated by an electric drive 32 in generator mode can be converted into heat energy. With this generated heat energy, individual components of the agricultural utility vehicle 10 can be heated, wherein the provided heating lines are not shown for the sake of simplicity.

In conclusion it should be noted in particular that the previously explained embodiments are used merely for describing the claimed teaching, which, however, is not limited to these embodiments.

Claims

1. Vehicle axle system for an agricultural or industrial utility vehicle, with a vehicle axle (30)—supported preferably so that it can oscillate—wherein at least two wheels (28) can be attached to the vehicle axle (30) so that they can rotate, with a torque tube (38), which can be connected on one end to a frame (14) of a vehicle (10) and on the other end to the vehicle axle (30) for supporting the axle suspension, and with at least one electric drive (32), which is arranged on the vehicle axle (30) and with which at least one wheel (28) attached to the vehicle axle (30) can be driven, characterized in that there are electric components (40, 42) for the electric drive (32) on—preferably in—the torque tube (38).

2. Vehicle axle system according to Claim 1, characterized in that the torque tube (38) has an essentially circular, oval, or polygonal cross section, is preferably assembled from several parts and in particular has a modular configuration.

3. Vehicle axle system according to Claim 1 or 2, characterized in that the electric components (40, 42) on the torque tube (38) have at least one power electronics component

(40), with which, for example, the magnitude of the electric power that can be delivered to the electric drive (32) can be controlled.

4. Vehicle axle system according to Claim 1 or 2, characterized in that at least one power electronics component (40) is arranged on the vehicle axle (30), wherein with the power electronics component (40), for example, the magnitude of the electric power that can be delivered to the electric drive (32) can be controlled.

5. Vehicle axle system according to one of Claims 1 to 4, characterized in that the electric components (40, 42) on the torque tube (38) have a frequency converter, with which preferably the electric alternating current of variable frequency that can be generated by an electric generator (26) can be converted first into direct current and then back into alternating current of a given frequency.

6. Vehicle axle system according to one of Claims 1 to 5, characterized in that the electric components (40, 42) on the torque tube (38) have braking resistance (42), with which preferably the electric current generated by the electric drive (32) that can be operated in generator mode can be converted into mechanical and/or thermodynamic energy.

7. Vehicle axle system according to one of Claims 1 to 6, characterized in that the electric components (40, 42) on the torque tube (38) have a controller, with which preferably the electric drive (32), optionally the power electronics component (40), the frequency converter, and/or the braking resistance (42) can be controlled or regulated.

8. Vehicle axle system according to one of Claims 1 to 7, characterized in that the vehicle axle (30) has a steering-type axle and/or is embodied as a front axle.

9. Vehicle axle system according to one of Claims 1 to 8, characterized in that on the torque tube (38) there is at least one electric interface, with which at least one electric line on the vehicle frame and/or on the vehicle axle (30) can be connected to at least one electric line on the torque tube (38).

10. Vehicle axle system according to one of Claims 1 to 9, characterized in that the electric components (40, 42) on the torque tube (38) can be preassembled in a carrier structure, wherein for final assembly, the carrier structure can be mounted on or in the torque tube (38).

11. Vehicle axle system according to one of Claims 1 to 10, characterized in that the surface and/or the walls of the vehicle axle (30) and/or the torque tube (38) is embodied such that cooling of the electric components (40, 42) is possible.

12. Vehicle axle system according to Claim 11, characterized in that the surface and/or the walls of the vehicle axle (30) and/or the torque tube (38) has cooling fins and/or at least one channel, wherein the channel preferably has a meander-like arrangement and, in particular, can carry a flow of coolant.

13. Torque tube, which can be connected on one end to a frame (14) of a vehicle (10) and on the other end to a vehicle axle (30) for supporting the axle suspension, characterized

in that the torque tube (38) can be attached to a vehicle axle system according to one of Claims 1 to 12.

14. Vehicle axle, which can be installed on a vehicle (10) so that it can move and which is supported preferably so that it can oscillate, wherein at least two wheels (28) can be attached to the vehicle axle so that they can rotate, characterized in that the vehicle axle (30) can be adapted to a vehicle axle system according to one of Claims 1 to 12.

15. Vehicle, in particular an agricultural or industrial utility vehicle, characterized by a vehicle axle system according to one of Claims 1 to 12.